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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/248,294	02/11/1999	HARLAN SEXTON	50277-179	8597

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EXAMINER

ZHEN, LI B

ART UNIT	PAPER NUMBER
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2126

13

DATE MAILED: 04/07/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/248,294

Applicant(s)

SEXTON ET AL.

Examiner

Li B. Zhen

Art Unit

2126

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 January 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-9, 11-13, 15-19, 22, 23, 25 and 26 is/are rejected.
- 7) ☒ Claim(s) 4, 10, 14, 20, 21 and 24 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Allowable Subject Matter

1. Claims 4, 10, 14, 20, 21, and 24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim Objections

2. New claims 22 and 25 are exactly the same and both of the claims depend from independent claim 1.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

4. Claims 5 and 15 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by U.S. Patent No. 6,345,276 to Lee.

As to claims 5 and 15, Lee teaches (column 6, lines 1 – 37) storing a first object (object0 203, Fig. 2) and a second object (object1 207, Fig. 2) in a memory (shared memory 200, Fig. 2) wherein the first object and the second object do not overlap each other (see Fig. 2), and storing a reference (offspring pointer 204) within a first object to a second object (object0 203 contains an offspring pointer 204 to object1 207, Fig. 2) in the memory. Lee teaches (column 6, lines 23 – 39) a numeric reference that encodes a location of the second object (address of object1 207, 10300, Fig. 2) as an offset (difference of fields 205 and 206 in offspring pointer 204, Fig. 2) from an address of the first object (address of object0 203, 10020, Fig. 2) in the memory. Lee teaches (column 6, lines 23 – 39) the calculation for the address of object1 207 is based on the smart pointer (both fields 205 and 206 of the offspring pointer 204) and the address of object0 203 ($10020 - 20 = 10000 + 300 = 10300$). Another way of representing the ' $10020 - 20 = 10000 + 300 = 10300$ ' formula would be $10020 + 280 = 10300$. Therefore, the difference of fields 205 and 206 ($300 - 20 = 280$) is the offset of object1 207 from the address of object0 203 ($10020 + 280 = 10300$).

As to claims 23 and 26, Lee (column 5, line 48 – column 6, line 5) a plurality of pages (virtual memory address space) and storing objects on the pages (see Fig. 2).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1, 2, 6 – 8, 11, 12, and 16 – 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,345,276 to Lee in view of “Under the hood: CLOS” (hereinafter Murray).

As to claim 1, Lee teaches (column 2, lines 22 – 45; column 5, lines 63 – 67; column 6, lines 1 – 37) generating a first machine pointer (absolute address) to a first object (data structure) referenced by a second object (pointed to by the smart pointer), fetching a numeric reference (smart pointer 204, Fig. 2) stored within the second object (object0 203, Fig. 2) based on a second machine pointer (object0 203 is referenced using address 10020) that points to the second object, and generating the first machine pointer (absolute address of object1 207, Fig. 2) as a sum including the numeric reference and the second machine pointer (calculation for the absolute address of object1 207...is $10020 - 20 = 10000 + 300 = 103000$). Lee teaches (column 6, lines 1 – 37) pointers and numeric references (smart pointers, this-pointer, destination-pointer, offspring pointer), but is silent as to whether the pointers and numeric references are tagged.

However, Murray discloses (column 3, p. 82) tagged pointers that provide information (a common implementation strategy used today is using the low 2 bits of a machine word as a tag field. When pointers are aligned on 32-bit word boundaries, the low 2 bits of the address are always zero which makes these bits available to carry additional information).

It would have been obvious the pointers as taught by Lee would also be tagged because the tag values of a pointer can provide important information such as

Art Unit: 2126

distinguishing between pointers and non-pointers (column 3, first paragraph, p. 82 of Murray).

As to claim 11, this is a product claim that corresponds to method claim 1; note the rejection of claim 1 above, which also meets this product claim.

As to claims 2 and 12, Lee teaches (column 6, lines 6 – 15) the sum further includes a predetermined constant (field 205 “this-pointer” contains the relative offset of the offspring pointer 204 from the start of the heap 201).

As to claims 6, 7, 16 and 17, Lee teaches (column 7, lines 62 – 67; column 8, lines 1 – 10 and 32 – 37) calculating a pointer difference (relative address is calculated by subtracting the base address from the input absolute address 307, Fig. 3A) between a first machine pointer to a first object (parent object) and a second machine pointer (absolute address of child object is obtained 411, and input into conversion method 413, Fig. 4) to a second object (newly created child object is linked to its parent object) to produce a self-relative numeric reference (the resulting relative address for the child object within the heap is stored in the destination-pointer of the parent object 415, Fig. 4). As to the pointers and numeric references being tagged, see the rejection of claim 1 above.

As to claims 8 and 18, Lee teaches (column 8, lines 1 – 10) the pointer difference further includes a predetermined constant (calculated by subtracting the offset value stored in the this-pointer).

As to claims 22 and 25, Lee teaches (column 2, lines 22 – 45; column 5, lines 63 – 67; column 6, lines 1 – 37) the sum consists (calculation for the absolute address of

object1 207...is $10020 - 20 = 10000 + 300 = 103000$) of the tagged numeric reference (smart pointer 204, Fig. 2) and the second tagged machine pointer (absolute address of object0 203).

7. Claims 3, 9, 13, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee and Murray further in view of U.S. Patent No. 6,003,123 to Carter.

As to claims 3, 9, 13, and 19, Lee as modified (column 3, p. 82 of Murray) teaches tagged portions in pointers and numeric references that can carry additional information. Lee as modified does not specify information that indicates whether two objects have the same contiguity.

However, Carter teaches (column 17, lines 62 – 67; column 18, lines 15 – 33) including contiguity information in a tag portion of the pointer (virtual page identifier identifies a page group, Fig. 13). If two object references have the same virtual page identifier, then they would belong in the same page group and have the same contiguity.

It would have been obvious to apply the teaching of including contiguity information in a tag portion of a pointer as taught by Carter to the invention of Lee as modified because contiguity information would determine if the objects belong in the same page group.

Response to Arguments

8. The applicant's representative argues "Lee discloses a smart pointer that 'contains two based addresses which are offsets relative to the start of a shared memory heap'...not the 'address of the first object in the memory'... smart pointer 204

itself stores in destination-pointer portion 206 the offset 300 of the object 207 in the heap 201, but not the offset of the object 207 from the address of object 203..." (p. 8, lines 14 – 20). The examiner respectfully disagrees because Lee teaches (column 6, lines 23 – 39) the calculation for the address of object 207 is based on the smart pointer (both fields 205 and 206 of the offspring pointer 204) and the address of object 203 ($10020 - 20 = 10000 + 300 = 10300$). Another way of representing the ' $10020 - 20 = 10000 + 300 = 10300$ ' formula would be $10020 + 280 = 10300$. Therefore, the difference of fields 205 and 206 ($300 - 20 = 280$) is the offset of object 207 from the address of object 203 ($10020 + 280 = 10300$).

Applicant's representative argues "the rejection cannot be salvaged by reading the recited 'first object,' not on the object 203, but on the entire heap 201..." (p. 8, lines 21 – 23). The examiner respectfully disagrees because object 203 can be read on the recited 'first object' (see response above) and object 203 contains an offset of object 207 from the address of object 203 (difference of fields 205 and 206). In addition, the examiner submits that object 203 and object 207 do not overlap each other (see Fig. 2 of Lee).

The applicant's representative appears to argue that "object 207 can have a different type from that of object 203" and "combining Lee with Murray results in an inoperable system in which all destination pointers are tagged with the type of the source pointers" (p. 9, lines 22 – 23, p. 10, lines 3 – 4). While this may generally be true, the combination of Lee with Murray would be operable if all the objects are of the same type and Lee does not appear to require objects to be of different types. Also, the

Art Unit: 2126

applicant's claims do not require the objects to be of different types. Applicant's representative proceeds to state that the combination of Lee and Murray would work with the addition of masking operation but that would not teach the claimed invention because the combination of Lee and Murray would require additional operations (p. 10, line 4 – 9). The examiner respectfully disagrees because although the combination of Lee and Murray may require additional operations such as masking, independent claims 1 and 11 do not restrict the use of masking operations.

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Li B. Zhen whose telephone number is (703) 305-3406. The examiner can normally be reached on Mon - Fri, 8am - 4:30pm.

Application/Control Number: 09/248,294
Art Unit: 2126

Page 9

The fax phone numbers for the organization where this application or proceeding is assigned are (703) 746-7239 for regular communications and (703) 746-7238 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

Li B. Zhen
Examiner
Art Unit 2126

lbz
April 2, 2003

Sue Lao